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3 REMARKS
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6 The Examiner's thoughtful attention to this application is sincerely appreciated.
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8 The Prior Art
9
10 The Wachi et al. reference (5,056,400) discloses a musical instrument with
11 an electro-acoustic transducer to generate musical tones. Some of the principal objectives
12 of the Wachi et al. reference are to:
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14
15 A. Permit the **size** of a guitar or other musical instrument **to be reduced** to
16 facilitate the use of the instrument and make it portable:
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18
19 *"The portable musical instrument is required to have a compact main body in
20 terms of easy carrying and easy standing performance. And a small-diameter
21 speaker is disposed in the compact main body."* Col. 1, lines 61 to 64.
22
23
24 *"Some portable musical instruments include a resonator for producing a bass
25 sound. However, the musical instrument of this type has a large main body
26 like an acoustic guitar to obtain sufficient sound quality, and is not suitable for
27 a standing performance. If the instrument of this type has a size suitable for
28 a standing performance, sufficient sound quality cannot be obtained.* Col. 1,

1 lines 67, 68 and Col. 2, lines 1 to 6.
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8 “*The present invention ... has as its first object to provide a portable musical*
9 *instrument which has dimensions suitable for portable use ...*” Col. 2, lines 1
10 to 4.
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12

- 13 B. Use a speaker to produce and Improve a **particular portion of the sound**
14 **range** of a musical instrument, typically the **bass** sound range:
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16

17 “*It is a second object of the present invention to provide an*
18 *electrical/electronic musical instrument which can improve a bass sound*
19 *characteristic without particularly increasing outer dimensions or can reduce*
20 *outer dimensions without impairing a bass sound characteristic ...*” Col. 2,
21 lines 14 to 19.
22
23

- 24 C. Alter the structure of the faceplate of a conventional acoustic guitar body with
25 a **wall** or **duct** to produce a new speaker “cabinet” or Helmholtz resonator:
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27

28 “*In the portable electrical musical instrument [of Figs. 3(a) and 3(b)], the*
29 *interior of a guitar body (instrument housing) 1 is partially partitioned for form*
30 *a closed **cabinet** 5. A speaker unit (vibrator) 4 is mounted in a hole formed*
31 *in a portion of a top plate 11 of body 1, which serves as one surface of the*
32 *closed **cabinet** 5. A **duct** 6 which forms a Helmholtz resonator together with*
33 *the closed **cabin** t 5 is arranged on the top plate 11.*” Col. 9, lines 47 to 49;
34
35

1 lines 52 to 54.

2
3 *"In this electrical musical instrument (Figs. 11 and 12), a small-diameter*
4 *speaker unit is used in a so-called semi-acoustic guitar whose thickness is*
5 *reduced to be smaller than that of a conventional acoustic guitar. A second*
6 *duct 6b having a second opening port 9b is provided to a top plate 11 of a*
7 *guitar body (instrument housing) 1 provided with a first duct 6a having a first*
8 *opening port (sound hole) 9a.... This musical instrument is arranged and*
9 *operated in substantially the same manner as the musical instrument shown*
10 *in Figs. 3(a) and 3(b) except that the equivalent resistance rp and the*
11 *equivalent mass mp shown in Fig. 5 are obtained by synthesizing those of the*
12 *ducts 6a and 6b since the ducts 6a and 6b are provided in place of duct 6*
13 *of the musical instrument shown in Figs. 3(a) and 3(b)." Col. 15, lines 18 to*
14 *25; 33 to 40.*

17
18 D. **Center speakers on openings** formed in the guitar body:

19
20 *See Fig. 1, Fig. 4, Fig. 10, Fig. 11, Fig. 12, etc.*

22
23 E. **Center speakers in the sound hole.** In Wachi et al., auxiliary speakers
24 openings are formed in the faceplate of the guitar. A speaker is not
25 positioned in the sound hole 12 (Fig. 3(a)) of a guitar.

27
28 F. On a guitar, use the different vibrations of each of the **strings** (reference

1 character 2 in Figs.1, 3(a), 3(b), 10, 11, 12, etc.) to generate tones:

2
3 “In addition, a tone generating circuit 7 such as a pickup for converting a
4 **mechanical or acoustic vibration** of the **tone generating device 2** into an
5 electrical signal and a vibrator driver 8 for driving the vibrator 4 on the basis
6 of the electrical signal supplied from the tone generating circuit 7.” Col. 7,
7 lines 56 to 61.

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9
10 “In addition, a pickup (tone generating circuit) 7 for converting a **vibration of**
11 **each guitar string** (tone generating device) 2 into an electrical signal and a
12 negative impedance generator (vibrator driver) 8 for driving the speaker unit
13 4 are arranged.” Col. 9, lines 53 to 58.

14
15
16 “A tone generating device 2 such as a membrane of a drum, **a string of a**
17 **guitar or the like**, a reed, or the like, for driving the Helmholtz resonator is
18 disposed near the opening port 9a.” Col. 14, lines 31 to 35.

19
20
21 “Furthermore, a pickup (tone generating circuit) 7 for converting a **vibration**
22 **of each guitar string** (tone generating device) 2 into an electrical signal and
23 a negative impedance generator (vibrator driver) 8 for driving the speaker unit
24 4 are arranged.” Col. 15, lines 27 to 31.

25
26
27 G. **Port sound outwardly** through openings formed in the guitar. Each of the
28 speaker openings in Wachi et al. ports sound outwardly away from the guitar.

1 The Invention

2
3 In contrast to the guitar disclosed in the Wachi et al. reference, the musical
4 instrument of the invention is not concerned with:

- 5
6
7 A. **Reducing** the size of an instrument.
8
9 B. Using a speaker to produce a **particular portion of the sound range** of a
10 musical instrument. In Applicant's instrument, the speakers produce notes
11 in the **entire** 80 to 1318 Hz sound range.

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13
14 Recitation in Claims: The use in the invention of a speaker to produce notes
15 in the entire 80 to 1318 Hz sound range is set forth in **Section (c) of**
16 **Applicant's new Claim 6**.

- 17
18
19 C. **Altering** the structure of the faceplate and of the body of a conventional
20 acoustic guitar body with a **wall or duct** to produce a new speaker "cabinet"
21 or Helmholtz resonator: Applicant's invention makes use of the resonance of
22 a conventional acoustic guitar body and does not install walls or ducts on the
23 faceplate in an attempt to alter the guitar body to produce a new Helmholtz
24 speaker--wall--duct resonator. Consequently, Applicant's instrument uses the
25 faceplate and **hollow hourglass shaped body of a conventional acoustic**
26 **guitar**, and the acoustic body in Appilcant's invention must therefore have the
27 **non-lin ar curvature and radii vector** discussed in the paragraph at the
28

bottom of page 10 of the Specification. In contrast, Wachi et al. would be satisfied using the rectangular box illustrated in several of the drawings in their patent. Applicant's acoustic guitar body must also be able to **amplify by ten to one-thousand times each frequency in the range of 440 Hz to 1318 Hz**. Since Wachi et al. is using a speaker to produce bass sounds and is modifying the structure of the faceplate of the acoustical housing to produce a speaker cabinet, it is unclear whether the Wachi et al. guitar will amplify the **entire sound range (400 Hz to 1318 Hz)** of notes in the manner of a conventional acoustic guitar.

Recitation in Claims: The use in the invention of an acoustic body that has non-linear radii vectors and that amplifies any frequency of sound in the range of 440 Hz to 1318 Hz is set forth in **Section (c) of new Claim 6.**

D. **Centering speakers on openings** formed in the guitar body. In Applicant's guitars, speakers are **offset** such that a portion of the speakers are in the sound hole and a portion of the speakers are offset from the sound hole to permit resonating sound to escape through the sound hole.

Recitation in Claims: The use of offset speakers in the invention is set forth in **section (d) of new Claim 3.**

E. **Placing speakers in faceplate openings formed away from the sound hole**. In the guitar of the invention, speakers are placed in or adjacent the sound

1 hole as can be seen in Figs. 1 to 3 of the application.
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3

4 Recitation in Claims: The use in the invention of speakers in and adjacent
5 the sound hole is set forth in **section (d) of new Claim 3.**
6

7 F. Using the different vibrations of each of the **strings** (reference character 2 in
8 Figs. 1, 3(a), 3(b), 10, 11, 12, etc.) to generate tones. In Applicant's invention
9 the string are **muted** (Specification, p. 14, second paragraph), the **vibrations**
10 **of strings are not used** to produce tones, and the strings function as
11 switches in the manner, for example, illustrated in Figs. 4 and 5.
12 Specification, paragraph spanning pages 14 and 15. Applicant's note tones
13 are synthetically produced and do not rely on the vibration of strings.
14

15
16 Recitation in Claims: The use in the invention of muted strings is set forth in
17 **section (b) of Claim 5.** The use of synthetically produced notes in
18 combination with an acoustic guitar body is set forth in **section (e) of Claim**
19 **5 and section (e) of Claim 6.**
20

21
22 G. Porting sound **inside** the guitar toward the acoustical guitar housing. In
23 Applicant's guitar, port 47 (Figs. 1, 2, 3) is located inside the guitar and directs
24 sound against (and not away from) the guitar body.
25

26
27 Recitation in Claims: The use of an internal port in the invention is set forth
28 in **section (e) of Claim 4.**

1 The foregoing functions and structural features of Applicant's guitar are important
2 because Applicant uses a **resonating acoustical guitar body to receive synthetic note**
3 **tones** that are produced using a mathematical analog algorithm or digital file. Specification,
4 page 3, second paragraph. The acoustical guitar body receives the synthetic note tones,
5 resonates, and produces sound that **complements** the synthetic note tones produced by
6 the speakers 41 to 43 (Fig. 3).

8
9 Accordingly, Applicant respectfully submits that the invention as set forth in
10 the new Claims is not anticipate under 35 U.S.C. §102 by the Wachi reference.
11

12 The Specification
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14
15 Applicant has endeavored to amend the Specification as suggested by the
16 Examiner.
17

18 The Claims
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20
21 Claims 1 and 2 are canceled, leaving new Claims 3 to 6. Specific features
22 of the invention set forth in each new Claim are noted above in the discussion of the
23 invention. A check is attached in the amount due for examination of two additional
24 independent Claims.
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28

1 Drawings

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3
4 Draftsman .
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6
7 If the Examiner finds merit in the foregoing remarks and amendments, it is
8 believed the application is in condition for allowance and such action is earnestly solicited.
9
10 Respectfully submitted,

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